

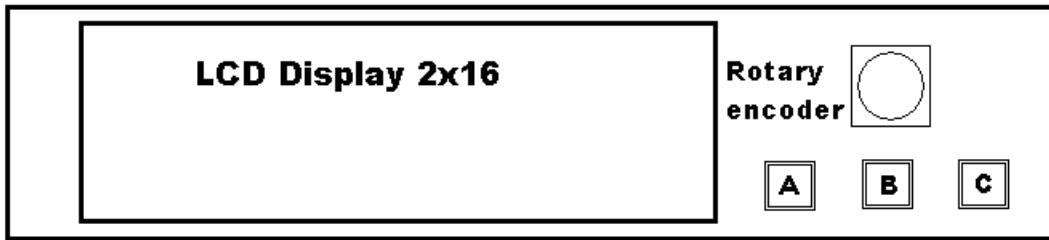
ATV Modulator User Manual



**FMTV Modulator by
Grant ZL1WTT & Keith ZL1BQE**

© 20 February 2004

Display board layout



The controller consists of a 2x 16 LCD display with three push buttons and a rotary encoder. The push button on the rotary encoder changes the stepping size.

Button A is the menu select. Button B selects between VFO and Memories 0 to 99. Button C selects between VFO and the preloaded presets. Turning the rotary encoder clockwise increase the selected value, anticlockwise will decrease the value.

VFO B or C

Memory B

Preset memory C

T 1.28325 GHz +
A 5.500 B 5.742

Memory 01
T 1.28600 GHz +

23cm Simplex 1
T 1.24800 GHz +

Button A: menu functions

Step 1: Entering local oscillator offsets. For the 23cm band, the offset value is 0 so the IF frequency is displayed. Other bands above 1.2 GHz can have a positive or negative offset value entered. This will allow the correct RF frequency to be displayed. In this mode, button B is the 1 GHz step size. The pushbutton on the rotary encoder selects the 100 MHz step. Button C is used to select between positive or negative offsets.

Step 2: Adjusting the transmit frequency. Pressing the rotary encoder pushbutton changes the steps sizes from between 50 KHz to 5 MHz.

Frequency offset
T .0000 GHz +



Enter frequency
T 1.28325 GHz



Step 3: Adjusting the Modulation settings for either positive or negative. This is designed for use with a high side local oscillator in an up-converter.

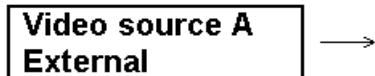
Step 4: Deviation setup: The PWM voltage range is 0 to 4.99 volts but only 1 volt of this range is used. The number displayed on the right sets the start point. The deviation will be shown as a percentage on the left.

Modulation
Positive +



Deviation
46 % 168

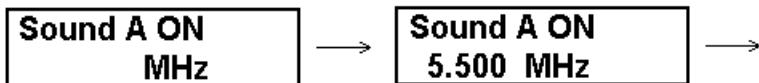




Step 5: Video input switching. Position A is for an external input. Position B is intended for use with an internal pattern and call sign generator, or an alternative video signal source.

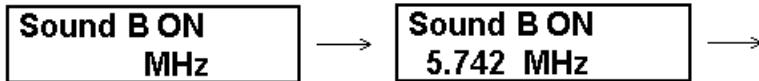
Step 6: Sound sub-carrier A / Sound channel 1 on / off switch. This menu entry allows the sound carrier to be turned on or off.

Step 7: Sound sub-carrier A / Sound channel 1 frequency. The sound sub-carrier frequency can be adjusted from 5.468 to 7.805 MHz in 7.8125 KHz steps. Pushing the button on the rotary encoder increases the step size by a factor of 10, i.e. 781.25 KHz.



Step 8: Sound sub-carrier B / Sound channel 2 on / off switch. This menu entry allows the sound carrier to be turned on or off.

Step 9: Sound sub-carrier B / Sound channel 2 frequency. The sound sub-carrier frequency can be adjusted from 5.468 to 7.805 MHz in 7.8125 KHz steps. Pushing the button on the rotary encoder increases the step size by a factor of 10, i.e. 781.25 KHz.



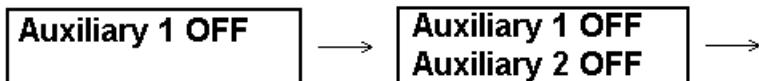
Step 10: RF Power Adjust. Selecting this allows you to change between high and low output power, by changing the LM2941 regulator's output voltage..

Step 11: RF Power Control. This turns the output RF on or off via the LM2941 regulator output.



Step 12 Auxiliary switch 1 on / off or on if modulator PLL is out of lock.

Step 13 Auxiliary switch 2 on / off.



Step 14 ASCII identification you can enter up to 16 characters to fit on the top line of the display. This function will only be useable in programmable memory mode.



At this point you exit back to the mode that you started from

ATV Modulator Setup Information

LM2941 Regulator set up

Power settings to control a power block output stage for M67715 or M68719. There are two preset pots on PCB next to LM2941 regulator. One set up the low voltage and the other sets the high voltage levels. This regulator can also be turned off via its on / off pin.

The DC voltage is feed via the F-connector across to the bias pin or pin 3 of the power block. With RF chokes on each of the PCBs, the RF and DC are feed along the coaxial cable that is used between these two modules.

DC feed voltage can also be set up to power an up converter.

Modulator output level

Between 10mW to 100mW out of ERA-5 drive stage.

VCO lock range

0 to 14 volts 1175 MHz to 1325 MHz depending on VCO set up.

Modulator bandwidth

0 to 30 MHz adjustable with 1 volt peak to peak into 75 ohms video input.

Video bandwidth

For PAL TV system DC to 5.2 MHz

Sound sub-carrier frequency range

From 5.468 to 7.805 MHz in 7.8125 KHz steps.

Sound PLL divider range frequency / 999 to 700.

Sound modulation bandwidth

20 Hz to 100 KHz x2.

Auxiliary switches

Are designed for extra switching if need.

Auxiliary switch 1 can use with an LED and resistor for out of lock indicator.

Communication bus

Can be mounted with a RS232 interface.

DC volts

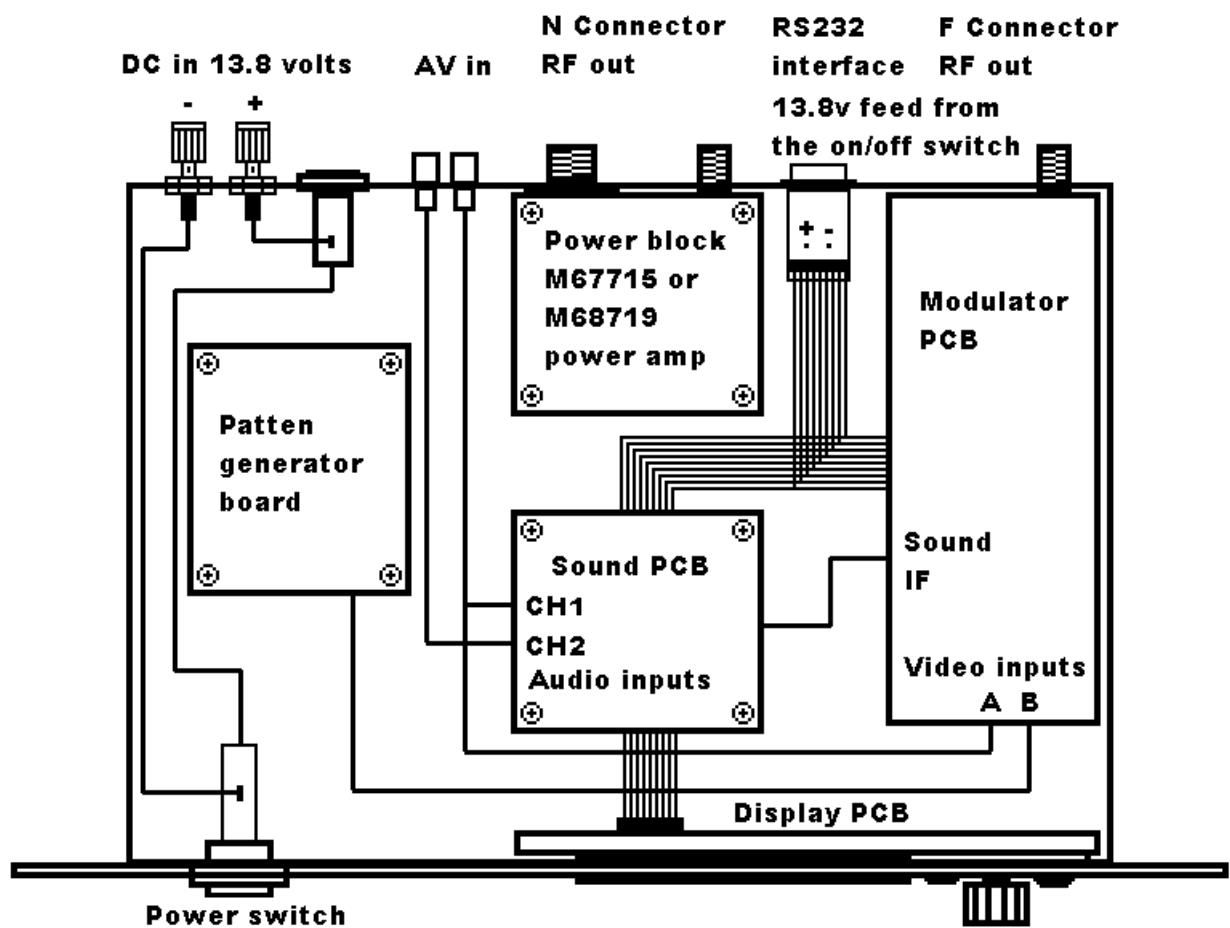
Input voltage into modulator 13.8 volts at 400 mA. With out the pattern generator and the power block connected to this 13.8 volts supply.

MC68HC908s and the 24LC64 are preprogrammed devices

All PCBs are mounted in a 1U 19" rack case L 424 x H 38 x W 254mm

See next page for layout information.

Modulator 1U 19" rack case layout

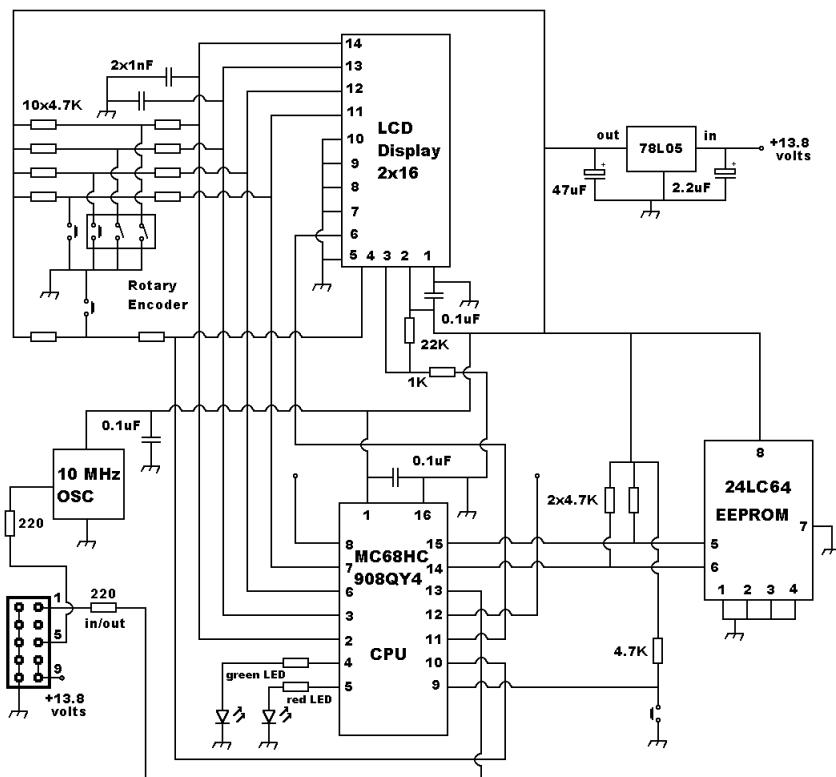


Component parts lists & circuit digrames

Display board

Resistors	Capacitors	I.C.s	Other bits
22k x 1	47uF x 1	2x16 LCD x 1	Rotary encoder x 1
4.7k x 13	2.2uF x 1	10MHz osc x 1	push buttons x 3
1k x 1	0.1uF x 3	MC68HC908QY4 x 1	
220 x 1	1nF x 2	24LC64 x 1	Red LED x 1
		78L05 x 1	Green LED x 1

Display board by ZL1BQE & ZL1WTT Ver 3.1



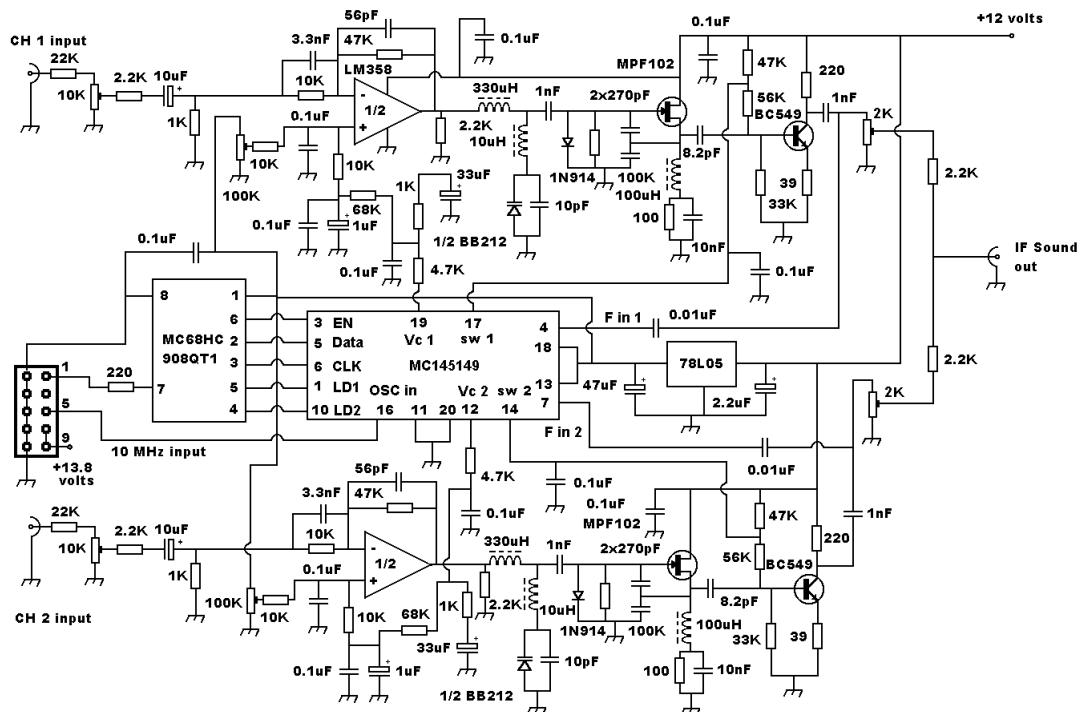
PCB size 38mm x 174mm

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Sound board

Resistors	Capacitors	Transistors	Trimpots	RF Chokes
100k x 2	47uF x 1	MPF102 x 2	100k x 2	560uH x 2
68k x 2	33uF x 2	BC549 x 2	10k x 2	100uH x 2
56k x 2	10uF x 2		2k x 2	10uH x 2
47k x 4	2.2uF x 1	Diodes		
33k x 2	1uF x 2			
22k x 2	0.1uF x 12	BB212 x 2	Diecast box	
10k x 6	0.01uF x 4	1N914 x 2		
4.7k x 2	3.3nF x 2			From RS 120 x 100 x 35
2.2k x 6	1nF x 4	I.C.s		Stock number 225-209
1k x 4	270pF x 4			
220 x 3	56pF x 2	78L05 x 1		
100 x 2	10pF x 2	MC68HC908QT1 x 1		
39 x 2	8.2pF x 2	MC145149 x 1		
		LM358 x 1		

5.4 MHz 7.8 MHz VCO by ZL1WTT Ver 2.8

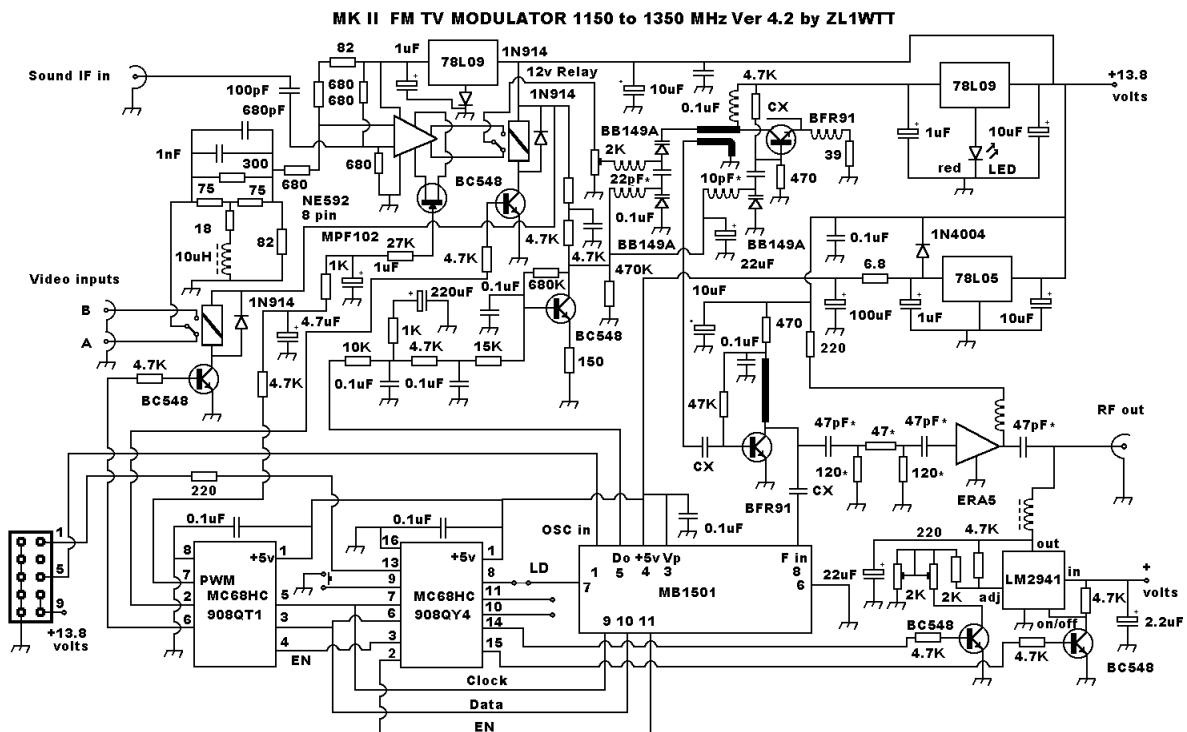


PCB size 86mm x 101mm

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Modulator board

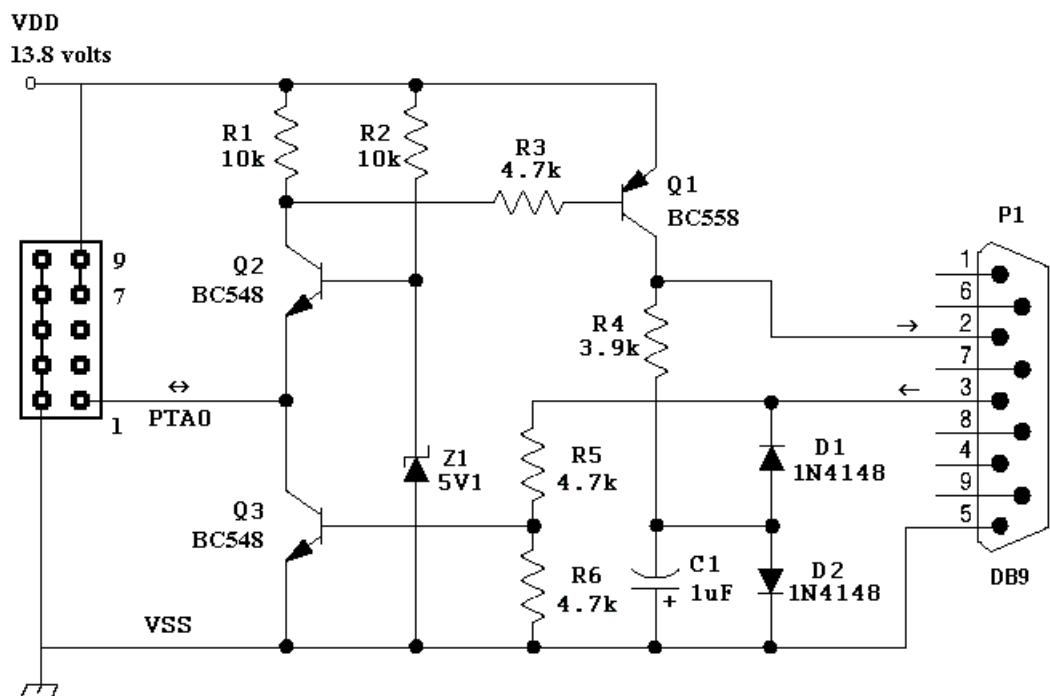
Resistors	Capacitors	Transistors	Trimpots	RF Chokes
680k x 1	220uF x 1	MPF102 x 1	2k x 3	10uH x 1
470k x 1	100uF x 1	BC548 x 5		Others x 6
47k x 1	22uF x 1	BFR91 x 2		
27k x 1	10uF x 5			Relays
22k x 1	4.7uF x 2			
15k x 1	2.2uF x 1			Mini 12V x 2
10k x 1	1uF x 4	1N4004 x 1		
4.7k x 10	0.1uF x 10	1N914 x 3		
4.7k x 1 SMD*	1nF x 2	BB149A x 3 SMD*		
1k x 2	680pF x 1	LED red x 1		
680 x 4	100pF x 1			
470 x 1	47pF x 3 SMD*	I.C.s		
470 x 1 SMD*	10pF x 1 SMD*			
300 x 1				7809 x 1
220 x 3				78L09 x 1
150 x 1				78L05 x 1
120 x 2 SMD*				LM2941 x 1
82 x 2				NE592N8 x 1
75 x 2				ERA-5 x 1
47 x 1 SMD*				MC68HC908QT1 x 1
39 x 1				MC68HC908QY4 x 1
18 x 1				MB1501 x 1
6.8 x 1				



PCB size 70mm x 212mm

Interface board

Resistors	Capacitors	Transistors	Diodes
10k x 2	1uF x 1	BC548 x 2	5V1 x 1
4.7k x 3		BC558 x 1	1N4148 x 2
3.9k x 1			



PCB size 40mm x 23mm

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